INSTRUCTION MANUAL

MODEL 2575

PRECISION AC-DC
ACTIVE CURRENT SHUNT

Valhalla Scientific Inc.

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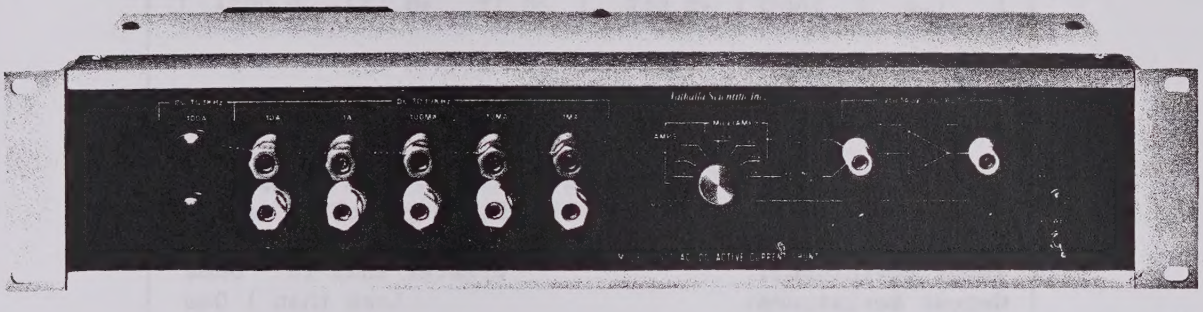

Model 2575 Precision AC-DC Active Current Shunt.

SPECIFICATIONS

RANGE AND ACCURACY

RANGE	SHUNT VALUE	DC ACCURACY	AC ACCURACY 1KHz	AC ACCURACY 10KHz	MAX INPUT DC/RMS AC
100A	0.001Ω	±0.05%	±0.1%	*	100A
10A	0.01Ω	±0.02%	±0.1%	±0.5%	20A
1A	0.1Ω	±0.02%	±0.1%	±0.1%	2A
100mA	1Ω	±0.01%	±0.1%	±0.1%	0.2A
10mA	10Ω	±0.01%	±0.1%	±0.1%	0.02A
1mA	100Ω	±0.01%	±0.1%	±0.1%	0.002A

*Not Specified

AMPLFIER CHARACTERISTICS

Amplitude Gain:	10.000
Gain Accuracy:	±0.01% ±10 uV RTI at DC
Frequency Response:	±0.05% to 10 KHz
Input Resistance:	Greater than 10^{10} Ohms
Output Resistance:	Less than 1 Ohm
Maximum Input Voltage:	±0.3 VDC or Peak AC

GENERAL INFORMATION

Temperature Range:	0 to 50°C
Temperature Coefficient:	Less than 0.001% per°C
Shunt Voltage Drop:	100.00 mV for full scale input
Power:	115/230 VAC 50-60 Hz 12 Watts (230 VAC Special Order)
Size:	3.5"H x 17"W x 6"D 8.9cm x 43.2cm x 15.2cm
Weight:	8 lbs. (3.6 Kg) Net 13 lbs. (5.9 Kg) Shipping

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SECTION I—DESCRIPTION

In the current measurement mode, the 2575 offers six isolated, switch-selectable decade ranges from 1 milliampere to 100 amperes full scale. Each shunt is a four-terminal non-inductive resistance element, insuring a flat frequency response. The three higher rated shunts are forced-air cooled to minimize temperature rise and maximize thermal stability.

The full scale voltage drop across any shunt is 100.00 millivolts at rated current. A buffer amplifier with a precision gain of 10.000 provides a higher level output which is capable of driving thermal transfer standards. The amplifier is available for use with external inputs. Its input impedance is 10,000 megohms.

When used as a set of laboratory standard resistors, the Model 2575 provides six decade value, four-terminal resistors from 0.001 ohm to 100 ohms. Each range is independently adjustable for ease of calibration at time of recertification.

SECTION II—INSTALLATION

The Model 2575 is normally produced for operation from 115 volt, 50-60 Hz power. When specified in the order, it will be provided for operation from 230 volt, 50-60 Hz power sources. Verify that the power requirements of the unit match the available power source before it is connected. When the Model 2575 is used as a bench-top instrument, no special installation procedures are required. If the "RX3" rack mount option is installed, the unit may be mounted in a standard 19-inch equipment rack. Whether used on a bench top or in an equipment rack, precautions must be taken to insure that there is no obstruction to airflow through the fan inlet and outlet. Also, when rack mounted, the ambient temperature within the equipment rack must not exceed 50°C when the Model 2575 is in operation.

SECTION III—OPERATION

To measure the load current, connect the load in series with the front panel terminals of the appropriate current shunt. Note the maximum current limit labels on the panel. To obtain a low resistance connection to the 100 ampere terminals, high-current spade lugs should be attached to the connecting wires. Set the selector switch to the appropriate range. Verify that an external input is not connected to the amplifier input terminals. Connect the measuring device (thermal transfer standard, DVM, etc.) to the output terminals, observing polarity (white terminal is positive). Note that the instrument output is limited to ±10 milliamperes, maximum. The output of the instrument is linear and full scale output at rated current on any range is 1.0000 volt ±0.01%.

It is not necessary that a load connected to one range be disconnected when connecting a load to another range as the selector switch isolates the shunts from one another.

The instrument may be used as an amplifier with a precision gain of 10.000 and 10,000 megohms input impedance over the range of DC to 10 KHz. To use this capability, place the selector switch in the EXT position. Connect the input signal to the amplifier input terminals, observing polarity. Note that the maximum input level is 200 millivolts. The amplifier is linear over the range of DC to 10 KHz and the full scale output is 1.0000 volt ±0.01% for an input level of 100 millivolts.

SECTION IV—DISASSEMBLY

It will be necessary to remove the covers of the instrument to gain access to the calibration adjustments. Covers are removed by removing three screws through each cover and then lifting the cover clear.

The front panel circuit board, to which the amplifier and lower rated shunt resistors are mounted, must be removed to remove and replace components or to replace a front panel terminal. The board is attached to the front panel by nuts threaded on the front panel terminals which must be removed to remove the board. The washers under the nuts should be replaced when replacing the board and the nuts tightened securely, since they provide the connection between the terminal and the shunt.

The power supply board is attached to the rear panel with screws, nuts and washers. However, it should not be necessary to remove the power supply board from the chassis, since all service connections are made on the top side of the board. If the transformer requires replacement, it is only necessary to unsolder its connections to the board and to remove the two screws that attach it to the rear panel. It is not necessary to remove the circuit board to replace the transformer.

SECTION V—CALIBRATION

The Model 2575 should be calibrated, at intervals best determined by the user, with the following procedure. Calibration requires a digital voltmeter with a DC accuracy of 0.005% on the 100 millivolt and 1 volt ranges (Hewlett Packard Model 3455A, or equivalent) and a current calibrator with current ranges of 100, 10, 1, 0.1, and 0.001 amperes (Valhalla Model 2555A, or equivalent). An alternate to the following calibration procedure is return of the instrument to Valhalla where calibration instruments with accuracies traceable to the U.S. Bureau of Standards are available. Refer to Section IV for removal of covers for access to adjustments.

5700 + Fluke 5220A + meter

1. Connect the digital voltmeter to the amplifier input terminals of the Model 2575. Select its 100 millivolt range and allow the manufacturer's recommended time for stabilization after applying power.

2. Place the selector switch in the 100A position.

3. Connect the current calibrator output to the 100A range terminals using high current spade lugs. Set the current calibrator output for 100 amperes and adjust R1 (see Figure 1) by filing to provide a DVM reading of 100.00 millivolts ±50 microvolts.

NOTE

If the DVM reading is greater than the specified limit, the resistance of R1 is too large and filing will increase it. It will be necessary to replace R1 or shunt it with another resistor of appropriate value before adjustment.

4. Place the selector switch in the 10A position.

5. Connect the current calibrator output to the 10A range terminals. Set the current calibrator output for 10 amperes and adjust R2 (see Figure 1) by filing to provide a DVM reading of 100.00 millivolts ±20 microvolts.

NOTE

If the DVM reading is greater than the specified limit, the resistance of R2 is too large and filing will increase it. It will be necessary to replace R2 or shunt it with another resistor of appropriate value before adjustment.

6. Place the selector switch in the 1A position.

7. Connect the current calibrator output to the 1A range terminals. Set the current calibrator output for 1 ampere and adjust R3 (see Figure 1) by filing to provide a DVM reading of 100.00 millivolts ±20 microvolts.

NOTE

If the DVM reading is greater than the specified limit, the resistance of R3 is too large and filing will increase it. It will be necessary to replace R3 or shunt it with another resistor of appropriate value before adjustment.

8. Set the selector switch to the 100mA range.

9. Connect the current calibrator output to the 100mA range terminals. Set the current calibrator output for 100 milliamperes and adjust R7 for a DVM reading of 100.00 millivolts ±10 microvolts.

10. Set the selector switch to the 10mA range.

11. Connect the current calibrator output to the 10mA range terminals. Set the current calibrator output for 10

milliamperes and adjust R8 for a DVM reading of 100.00 millivolts ±10 microvolts.

12. Set the selector switch to the 1mA range.

13. Connect the current calibrator output to the 1mA range terminals. Set the current calibrator output for 1 milliamperes and adjust R9 for a DVM reading of 100.00 millivolts ±10 microvolts.

14. Repeat the above sequence at 1 KHz for the 100A and 10A ranges and 10 KHz for the 1mA through the 10A ranges to verify AC performance.

15. Set the selector switch to the EXT position.

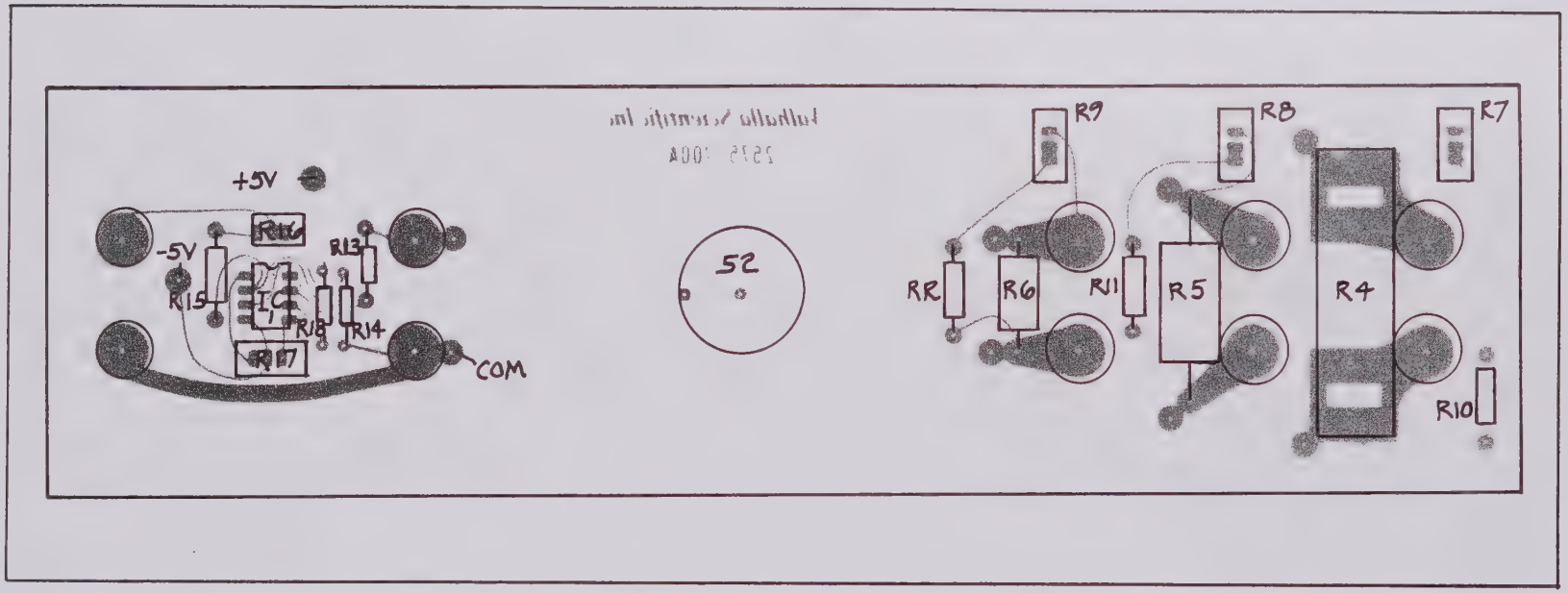


Figure 1. Front Panel Circuit Board Assembly.

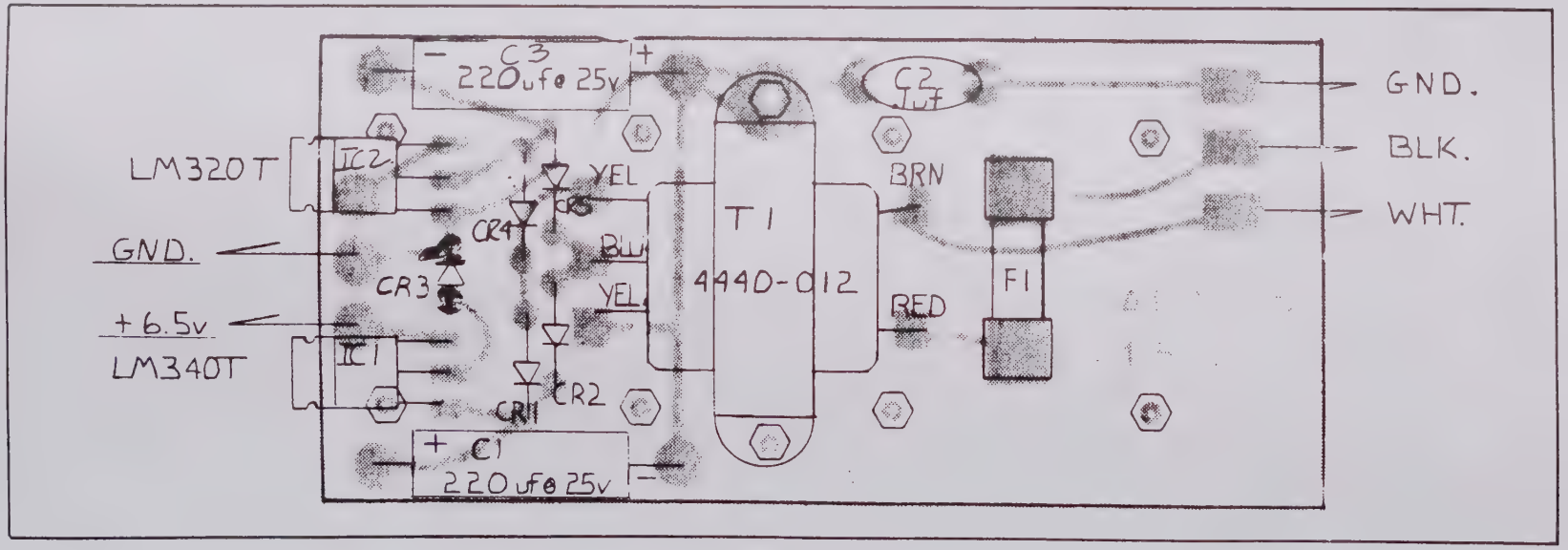


Figure 2. Power Supply Circuit Board Assembly.

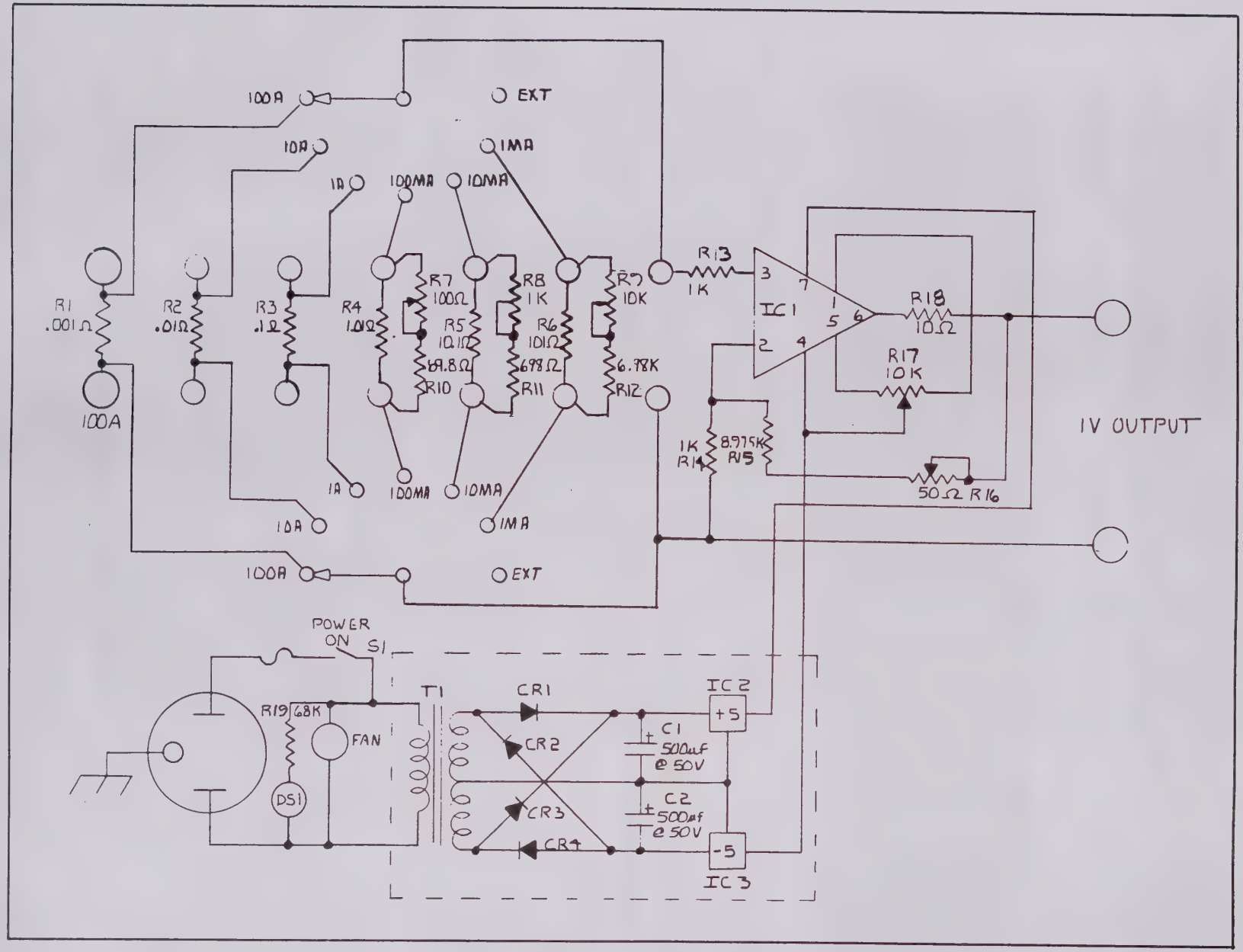


Figure 3. Schematic Diagram, Model 2575 Active Current Shunt.

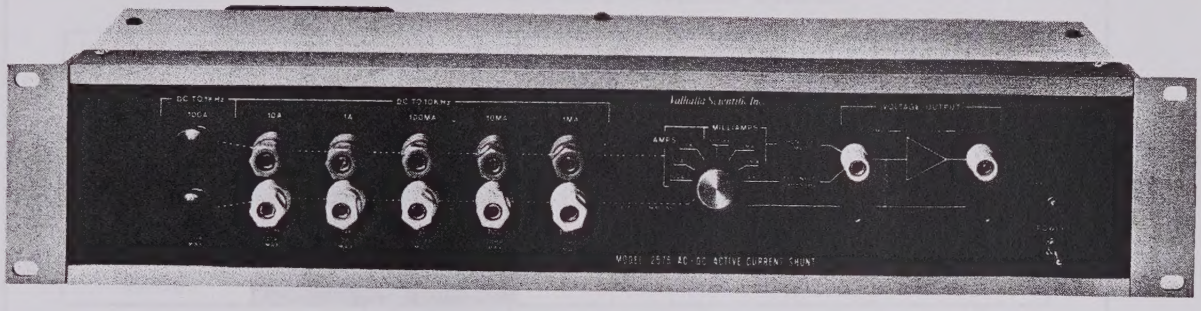
Valhalla Scientific Inc

PARTS LIST

REF. DES.	V.S. P/N	DESCRIPTION	MFG.	MFG. P/N
DS1	5-01006	NEON INDICATOR LIGHT	IND DEV	
IC1	3-30117	IC OP AMP	27014	LH0052H
J1-5	5-10021	BINDING POST RED	83330	257-RED
J6-10	5-10102	BINDING POST WHT	83330	257-WHT
J11, 12	5-10164	BINDING POST BLUE	83330	1517-BLU
J13, 14	5-10002	BINDING POST WHT	83330	1517-WHT
R 1	1-20060	RES FXD .001Ω WW	MTD	1-20060
R 2	1-20061	RES FXD .01Ω WW	MTD	1-20061
R 3	1-20062	RES FXD .1Ω WW	MTD	1-20062
R 4	1-20022	RES FXD 1.01Ω .1%	53504	1-20022 S-346
R 5	1-20063	RES FXD 10.1Ω WW	53504	1-20063
R 6	1-20064	RES FXD 101Ω WW	53504	1-20064
R 7	1-50014	RES VAR 100Ω	80294	3255W-100Ω
R 8	1-50013	RES VAR 1K	80294	3255W-1K
R 9, 17	1-50012	RES VAR 10K	80294	3255W-10K
R 10	1-10032	RES FXD 69.8Ω 1%	81349	RN60C69R8F
R 11	1-10014	RES FXD 698Ω 1%	81349	RN60C6980F
R 12	1-10035	RES FXD 6.98K 1%	81349	RN60C6981F
R 13	1-01041	RES FXD 1K 1/4W 5%	81349	RC07GF102J
R 15	1-20011	RES FXD 8.9725K WW	53504	1-20011
R 16	1-50033	RES VAR 50Ω	80294	3255W-50Ω
R 18	1-01007	RES FXD 10Ω 1/4W 5%	81349	RC07GF100J
R 19	1-01077	RES FXD 68K 1/4W 5%	81349	RC07GF683J
R 14	1-20016	RES FXD 1K .05%	81349	J110-1K
S 1	5-03007	TOGGLE SWITCH	95146	MST-105D
S 2	5-03031	SWITCH	71590	SA-203-3F-000
1 ea		POWER SUPPLY ASS'Y	53504	4440-310
1 ea	5-10067	POWER CORD	70903	17250
1 ea	5-10115	FAN	82877	SU2A1
2 ea	5-10116	FINGER GUARD	82877	476143
1 ea	4-30035	PC BOARD	53504	2575-700A
1 ea	4-10121	CHASSIS	53504	2575-203B
1 ea	4-10122	FRONT PANEL	53504	2575-204B
2 ea	4-10204	TOP & BOTTOM COVERS	53504	2575-211
1 ea	5-10063	POWER CONN	82389	EAC-301
10 ea	5-10156	TINNERMAN NUTS		C8094-632-24
2 ea	4-10170	BEZEL	53504	2701-200A
2 ea	4-10171	RACK BRACKET	53504	2701-201A
2 ea		1/4 - 20 x 1" BRASS BOLTS		
4 ea		1/4 - 20 BRASS HEX NUTS		
1 ea	5-10165	KNOB	ROGAN	GR112D/2 Set Screws

MODEL:	TITLE:	SHT	OF
2575	ACTIVE CURRENT SHUNT	1	1

VALHALLA SCIENTIFIC MODEL 2575
PRECISION AC-DC ACTIVE CURRENT SHUNT



Ideal for use as a Low Ohms Laboratory Standard Resistance Bank

- **100 Amperes to 1mA**
- **4 Terminal Configuration**
- **DC to 10 KHz**
- **Thermal Transfer Compatible**
- **Built-In Buffer Amplifier**
- **±0.01% Basic Accuracy**

The 2575 Precision AC-DC Active Current Shunt is truly a hard working instrument designed for the calibration laboratory. The unit doubles as a measurement tool for AC and DC currents as well as a reference standard for resistance calibration requirements.

In the current measurement mode the 2575 offers six isolated, switch selectable ranges from 100 amperes to 1 milliamp full scale. Each shunt employs a 4-terminal non-inductive resistance element to insure a flat frequency response. The higher rated shunts are fan cooled to minimize temperature rise thereby maximizing thermal stability.

The full scale voltage drop across the shunt is 100.00 millivolts at rated current. A precision gain of 10.000 buffer amplifier is incorporated to provide a higher level output, capable of driving thermal transfer standards. The amplifier is available for use with external inputs and features an input impedance of 10,000 megohms.

When used as a set of laboratory standard resistors, the Model 2575 provides six decade value, 4-terminal resistors from .001 ohm to 100 ohms. Each range is independently adjustable for ease of calibration at recertification time.

Valhalla Scientific Inc.

7576 Trade Street, San Diego, CA 92126
(714) 277-2732 TWX #910 335 2015

VALHALLA SCIENTIFIC MODEL 2575
PRECISION AC-DC ACTIVE CURRENT SHUNT

SPECIFICATIONS

RANGE	SHUNT VALUE	DC ACCURACY	AC ACCURACY 1 KHz	AC ACCURACY 10 KHz	MAX INPUT DC/RMS AC
100A	.001 Ω	± .05%		Not Specified	100A
10A	.01 Ω	± .02%		± 5%	20A
1A	.1 Ω	± .02%			2A
100mA	1 Ω	± .01%			.2A
10mA	10 Ω	± .01%			.02A
1mA	100 Ω	± .01%			.002A

AMPLIFIER CHARACTERISTICS

Amplitude Gain: 10.000
Gain Accuracy: ±0.01% ±10μV RTI @ DC
Frequency Response: ± 0.05% to 10 KHz
Input Resistance: Greater than 10^{10} Ω
Output Resistance: Less than 1Ω

GENERAL INFORMATION

Temperature Range: 0 to 50°C
Temperature Coefficient: Less than 0.001% per °C
Voltage Drop (before amplifier): 100.00 mV for full scale input
Power: 115/230 VAC 50-60 Hz 12 Watts (230 VAC Special Order)
Size: 3.5″H x 17″W x 6″D (8.9cm x 43.2cm x 15.2cm)
Weight: 8 lbs. (3.6 KG) Net 13 lbs. (5.9 KG) Shipping

ORDERING INFORMATION

Model 2575	AC-DC Active Current Shunt	$995
Option "HC"	2555A to 2575 100A 6′ Cable Set	$100
Option "C"	48″ Shielded Cable Dual Banana to Clips	$ 15
Option "BBC"	48″ Shielded Cable Dual Banana to Dual Banana	$ 15
Option "RX3"	3.5″ x 19″ Rack Mount Adaptor	N/C

Specifications and prices subject to change without notice unless brochure is submitted as part of a written quotation or proposal in which case the specifications and prices remain firm for the valid period of the quotation or proposal.

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MODEL 2575

PRECISION AC-DC ACTIVE CURRENT SHUNT

ORDERING INFORMATION

MODEL 2575	PRECISION AC-DC-ACTIVE CURRENT SHUNT
OPTION HC	2555A TO 2575 100A 6' CABLE SET
OPTION C	48" SHIELDED CABLE DUAL BANANA TO CLIPS
OPTION BBC	48" SHIELDED CABLE DUAL BANANA TO DUAL BANANA
OPTION RX3	3.5" X 19" RACK MOUNT ADAPTOR

F.O.B San Diego, Calif. Terms: Net 30 Days Delivery: Stock to 30 Days

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00001	Monsanto, Electronic Special Products, Cupertino, Calif.
00656	Aerovox Corporation, New Bedford, Mass
00853	Sangamo Electric Company, Pickens, S.C.
01121	Allen-Bradley Company, Milwaukee, Wisc.
01255	Litton Industries, Inc., Beverly Hills, Calif.
01281	T R W Semiconductors, Inc., Lawndale, Calif.
01295	Texas Instruments, Inc., Dallas, Texas
02335	Fairchild Controls Corp., Hicksville, LI, N.Y.
02660	Amphenol Corporation, Broadview, N.Y.
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12405	Hysol Corporation, El Monte, Calif.
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16758	Delco Radio Div., General Motors, Kokomo, Ind.
17838	Mektron, California General, Inc., Chula Vista, Calif.
18324	Signetics, Sunnyvale, Calif.
18722	R C A, Mountaintop, Pa.
21604	Buckeye Stamping Company, Columbus, Ohio
25684	Victoreen Instrument Co., Inc., Oak Lawn, Ill.
27014	National Semi-Conductor Corp., Santa Clara, Calif.
27556	IMB Electronic Products, Santa Fe Springs, Calif.
28480	Hewlett-Packard Co., Palo Alto, Calif.
30983	Electra/Midland, San Diego, Calif.
44655	Ohmite Manufacturing Company, Skokie, Ill.
71279	Cambridge Thermionic Corp., Cambridge, Mass.
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71590	Centralab Div., Globe-Union, Inc., Milwaukee, Wisc.
71785	Cinch Manufacturing Company, Chicago, Ill.
73899	J F D Electronics Company, Brooklyn, N.Y.
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76055	Mallory Controls, Frankfort, Ind.
76493	J. W. Miller Company, Los Angeles, Calif.
78488	Stackpole Carbon Company, St. Marys, Pa.
80294	Bourns, Incorporated, Riverside, Calif.
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81312	Winchester Electronics, Oakville, Ct.
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82389	Switchcraft, Incorporated, Chicago, Ill.
83330	Herman H. Smith, Inc., Brooklyn, N.Y.
84171	Arco Electronics, Inc., Great Neck, N.Y.
86684	R C A, Harrison, N.J.
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90201	Mallory Capacitor Company, Indianapolis, Ind.
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91929	Micro Switch Div., Honeywell, Inc., Freeport, Ill.
92194	Alpha Wire Corporation, Elizabeth, N.J.
93332	Sylvania Electric Products, Inc., Woburn, Mass
98978	IERC, Burbank, Calif.
00002	Jordan Electronics, Van Nuys, Calif.
53504	Valhalla Scientific, Inc., San Diego, Calif.

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